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(54) **Use of a polyhydroxyfatty acid amide compound as a softening compound**

(57) There is provided the use of a polyhydroxyfatty acid amide compound as a softening compound and as an agent improving fabric appearance upon repeated laundering.

**EP 0 919 608 A1**

**Description****Technical field of the invention**

- 5 [0001] The present invention relates to the use of a polyhydroxyfatty acid amide compound as a softening compound and as an agent improving fabric appearance upon repeated laundering.

**Background of the invention**

- 10 [0002] The appearance of fabrics, e.g., clothing, bedding, household fabrics such as table linens is one of the area of concern to consumers. Indeed, upon typical consumer's uses of the fabrics such as wearing, washing, rinsing and/or tumble-drying of fabrics, a loss in the fabric appearance.
- [0003] Typically, to solve this problem of fabric appearance loss, softening compounds of the quaternary ammonium type have been employed. Exemplary disclosure of such quaternary ammonium softening compounds include the tra-
- 15 ditionally used di-long chain ammonium chlorides such as ditallowdimethylammonium chloride and N,N-di(tallowyl-oxy-ethyl)-N,N-dimethyl ammonium chloride. Said materials and fabric softening compositions containing them are disclosed in numerous publications such as EPA 040 562, and EPA 239 910.
- [0004] Still other softening compounds are the alkyl glycosides compounds described in WO 92/22698 as auxiliaries in the pretreatment of textiles. Further softening compounds are the sugar esters described in EP-A-0,380,406 as soft-
- 20 ening and whitening agents.
- [0005] Notwithstanding the advances in the art, there is still a need for compounds having a softening activity.
- [0006] It has now been found that the compounds of the polyhydroxyfatty acid amide type have a softening activity enabling their use as a softening compound.
- [0007] Polyhydroxyfatty acid amide compounds are known in detergent compositions as described in EP-0,558,515 and EP-0,550,634 as a nonionic surfactant which provide cleaning benefit.
- 25 [0008] It is therefore an advantage of the invention to provide the use of a polyhydroxyfatty acid amide compound as a softening compound.
- [0009] Traditional softening compounds of the quaternary ammonium type are also known to provide, in addition to their softening effect, easier ironing process, as well as a reduction in the fabric abrasion.
- 30 [0010] Accordingly, the polyhydroxyfatty acid amide has also been found effective as ironing aid as well as for inhibiting or reducing fabric abrasion.

Summary of the invention

- 35 [0011] The present invention relates to the use of a polyhydroxyfatty acid amide compound as a softening compound.
- [0012] In another aspect, the present invention also relates to the use of said compound as an ironing aid.
- [0013] In a further aspect, the present invention also relates to the use of said compound for reducing fabric abrasion.

Detailed description of the invention

40 Polyhydroxyfatty acid amide compound

- [0014] A polyhydroxyfatty acid amide compound is the essential component of the invention.
- [0015] Preferably, the polyhydroxyfatty acid amide compound for the purpose of the invention have the formula:



- wherein :  $R^1$  is H,  $C_1$ - $C_4$  hydrocarbyl, 2-hydroxy ethyl, 2-hydroxypropyl, or a mixture thereof, and  $R^2$  is a  $C_5$ - $C_{31}$  hydrocarbyl; and Z is a polyhydroxyhydrocarbyl having a linear hydrocarbyl chain with at least 3 hydroxyls directly connected to the chain, or an alkoxyated derivative thereof which is preferably ethoxyated or propoxyated.

- 50 [0016] Preferably,  $R^1$  is  $C_1$ - $C_4$  alkyl, more preferably  $C_1$  or  $C_2$  alkyl, most preferably  $C_1$  alkyl (i.e., methyl).
- [0017] Preferably,  $R^2$  is a straight chain  $C_7$ - $C_{19}$  alkyl or alkenyl, more preferably straight chain  $C_9$ - $C_{17}$  alkyl or alkenyl, most preferably straight chain  $C_{11}$ - $C_{17}$  alkyl or alkenyl, or mixtures thereof.
- [0018] Z preferably will be derived from a reducing sugar in a reductive amination reaction; more preferably Z is a glycidyl. Suitable reducing sugars include glucose, fructose, maltose, lactose, galactose, mannose, and xylose. As raw materials, high dextrose corn syrup can be utilized as well as the individual sugars listed above. These corn syrups may yield a mix of sugar components for Z. It should be understood that it is by no means intended to exclude other suitable raw materials. Z preferably will be selected from the group consisting of  $-CH_2-(CHOH)_n-CH_2OH$ ,  $-CH(CH_2OH)-$

$(\text{CHOH})_{n-1}-\text{CH}_2\text{OH}$ ,  $-\text{CH}_2-(\text{CHOH})_2(\text{CHOR}')(\text{CHOH})-\text{CH}_2\text{OH}$ , where  $n$  is an integer from 3 to 5, inclusive, and  $R'$  is H or a cyclic or aliphatic monosaccharide, and alkoxylated derivatives thereof. Most preferred are glycityls wherein  $n$  is 4, particularly  $-\text{CH}_2-(\text{CHOH})_4-\text{CH}_2\text{OH}$ .

[0019] In Formula (1),  $R^1$  can be, for example, N-methyl, N-ethyl, N-propyl, N-isopropyl, N-butyl, N-2-hydroxy ethyl, or N-2-hydroxy propyl.

$R^2-\text{CO}-\text{N}<$  can be, for example, cocamide, stearamide, oleamide, lauramide, myristamide, capricamide, palmitamide, tallowamide, etc.

Z can be 1-deoxyglucityl, 2-deoxyfructityl, 1-deoxymaltityl, 1-deoxylactityl, 1-deoxygalactityl, 1-deoxymannityl, 1-deoxymaltotriosityl, etc.

[0020] The polyhydroxyfatty acid amide compound can be employed in any compositions where there is a need for a softening of the fabrics such as in stand alone product including pre-or post-wash additives. It can also be employed in fully-formulated laundry and cleaning compositions such as softening compositions including rinse added fabric softener compositions and dryer added compositions (e.g. sheets).

[0021] Typical levels of incorporation of the polyhydroxyfatty acid amide compound within the softening compositions is of from 0.005% to 50%, more preferably from 0.05% to 20%, most preferably from 0.1% to 5% by weight of the composition.

[0022] When incorporated into softening compositions, the compositions will comprises optional ingredients conventional to fabric softening compositions.

## OPTIONAL INGREDIENTS

### (A)-Liquid carrier

[0023] An optional, but preferred, ingredient is a liquid carrier. The liquid carrier employed in the instant compositions is preferably at least primarily water due to its low cost, relative availability, safety, and environmental compatibility. The level of water in the liquid carrier is preferably at least about 50%, most preferably at least about 60%, by weight of the carrier. Mixtures of water and low molecular weight, e.g., <about 200, organic solvent, e.g., lower alcohols such as ethanol, propanol, isopropanol or butanol are useful as the carrier liquid. Low molecular weight alcohols include monohydric, dihydric (glycol, etc.) trihydric (glycerol, etc.), and higher polyhydric (polyols) alcohols.

### (B)-Additional Solvents

[0024] The compositions of the present invention may comprise one or more solvents which provide increased ease of formulation. These ease of formulation solvents are all disclosed in WO 97/03169. This is particularly the case when formulating liquid, clear fabric softening compositions. When employed, the ease of formulation solvent system preferably comprises less than about 40%, preferably from about 10% to about 35%, more preferably from about 12% to about 25%, and even more preferably from about 14% to about 20%, by weight of the composition. The ease of formulation solvent is selected to minimize solvent odor impact in the composition and to provide a low viscosity to the final composition. For example, isopropyl alcohol is not very effective and has a strong odor. n-Propyl alcohol is more effective, but also has a distinct odor. Several butyl alcohols also have odors but can be used for effective clarity/stability, especially when used as part of a ease of formulation solvent system to minimize their odor. The alcohols are also selected for optimum low temperature stability, that is they are able to form compositions that are liquid with acceptable low viscosities and translucent, preferably clear, down to about 4.4°C and are able to recover after storage down to about -6.7°C.

[0025] The suitability of any ease of formulation solvent for the formulation of the liquid, concentrated, preferably clear, fabric softener compositions herein with the requisite stability is surprisingly selective. Suitable solvents can be selected based upon their octanol/water partition coefficient (P) as defined in WO 97/03169.

[0026] The ease of formulation solvents herein are selected from those having a ClogP of from about 0.15 to about 0.64, preferably from about 0.25 to about 0.62, and more preferably from about 0.40 to about 0.60, said ease of formulation solvent preferably being at least somewhat asymmetric, and preferably having a melting or solidification point that allows it to be liquid at, or near room temperature. Solvents that have a low molecular weight and are biodegradable are also desirable for some purposes. The more asymmetric solvents appear to be very desirable, whereas the highly symmetrical solvents such as 1,7-heptanediol, or 1,4-bis(hydroxymethyl) cyclohexane, which have a center of symmetry, appear to be unable to provide the essential clear compositions when used alone, even though their ClogP values fall in the preferred range.

[0027] The most preferred ease of formulation solvents can be identified by the appearance of the softener vesicles, as observed via cryogenic electron microscopy of the compositions that have been diluted to the concentration used in the rinse. These dilute compositions appear to have dispersions of fabric softener that exhibit a more uni-lamellar

appearance than conventional fabric softener compositions. The closer to uni-lamellar the appearance, the better the compositions seem to perform. These compositions provide surprisingly good fabric softening as compared to similar compositions prepared in the conventional way with the same fabric softener active.

[0028] Operable ease of formulation solvents are disclosed and listed below which have ClogP values which fall within the requisite range. These include mono-ols, C6 diols, C7 diols, octanediol isomers, butanediol derivatives, trimethylpentanediol isomers, ethylmethylpentanediol isomers, propyl pentanediol isomers, dimethylhexanediol isomers, ethylhexanediol isomers, methylheptanediol isomers, octanediol isomers, nonanediol isomers, alkyl glyceryl ethers, di(hydroxy alkyl) ethers, and aryl glyceryl ethers, aromatic glyceryl ethers, alicyclic diols and derivatives, C<sub>3</sub>-C<sub>7</sub> diol alkoxylated derivatives, aromatic diols, and unsaturated diols. Particularly preferred ease of formulation solvents include hexanediols such as 1,2-Hexanediol and 2-Ethyl-1,3-hexanediol and pentanediols such as 2,2,4-Trimethyl-1,3-pentanediol.

#### (C)-Dispersibility Aids

[0029] Relatively concentrated compositions containing both saturated and unsaturated diester quaternary ammonium compounds can be prepared that are stable without the addition of concentration aids. However, the compositions of the present invention may require organic and/or inorganic concentration aids to go to even higher concentrations and/or to meet higher stability standards depending on the other ingredients. These concentration aids which typically can be viscosity modifiers may be needed, or preferred, for ensuring stability under extreme conditions when particular softener active levels are used. The surfactant concentration aids are typically selected from the group consisting of (1) single long chain alkyl cationic surfactants; (2) nonionic surfactants; (3) amine oxides; (4) fatty acids; and (5) mixtures thereof. These aids are described in WO 94/20597, specifically on page 14, line 12 to page 20, line 12, which is herein incorporated by reference.

When said dispersibility aids are present, the total level is from 2% to 25%, preferably from 3% to 17%, more preferably from 4% to 15%, and even more preferably from 5% to 13% by weight of the composition. These materials can either be added as part of the active softener raw material, (I), e.g., the mono-long chain alkyl cationic surfactant and/or the fatty acid which are reactants used to form the biodegradable fabric softener active as discussed hereinbefore, or added as a separate component. The total level of dispersibility aid includes any amount that may be present as part of component (I).

[0030] Inorganic viscosity/dispersibility control agents which can also act like or augment the effect of the surfactant concentration aids, include water-soluble, ionizable salts which can also optionally be incorporated into the compositions of the present invention. A wide variety of ionizable salts can be used. Examples of suitable salts are the halides of the Group IA and IIA metals of the Periodic Table of the Elements, e.g., calcium chloride, magnesium chloride, sodium chloride, potassium bromide, and lithium chloride. The ionizable salts are particularly useful during the process of mixing the ingredients to make the compositions herein, and later to obtain the desired viscosity. The amount of ionizable salts used depends on the amount of active ingredients used in the compositions and can be adjusted according to the desires of the formulator. Typical levels of salts used to control the composition viscosity are from about 20 to about 20,000 parts per million (ppm), preferably from about 20 to about 11,000 ppm, by weight of the composition.

Alkylene polyammonium salts can be incorporated into the composition to give viscosity control in addition to or in place of the water-soluble, ionizable salts above. In addition, these agents can act as scavengers, forming ion pairs with anionic detergent carried over from the main wash, in the rinse, and on the fabrics, and may improve softness performance. These agents may stabilize the viscosity over a broader range of temperature, especially at low temperatures, compared to the inorganic electrolytes.

[0031] Specific examples of alkylene polyammonium salts include L-lysine monohydrochloride and 1,5-diammonium 2-methyl pentane dihydrochloride.

#### (D)-Dye fixing agent

[0032] The composition of the invention may optionally comprise a dye fixing agent. Dye fixing agents, or "fixatives", are well-known, commercially available materials which are designed to improve the appearance of dyed fabrics by minimizing the loss of dye from fabrics due to washing. Not included within this definition are components which are fabric softeners or those described hereinbefore as amino-functional polymers.

[0033] Many dye fixing agents are cationic, and are based on various quaternized or otherwise cationically charged organic nitrogen compounds. Cationic fixatives are available under various trade names from several suppliers. Representative examples include: CROSCOLOR PMF (July 1981, Code No. 7894) and CROSCOLOR NOFF (January 1988, Code No. 8544) from Crosfield; INDOSOL E-50 (February 27, 1984, Ref. No. 6008.35.84; polyethyleneamine-based) from Sandoz; SANDOFIX TPS, which is also available from Sandoz and is a preferred polycationic fixative for use herein and SANDOFIX SWE (cationic resinous compound), REWIN SRF, REWIN SRF-O and REWIN DWR from CHT-

Beitlich GMBH, Tinofix<sup>®</sup> ECO, Tinofix<sup>®</sup> FRD and Solfin<sup>®</sup> available from Ciba-Geigy.

[0034] Other cationic dye fixing agents are described in "Aftertreatments for improving the fastness of dyes on textile fibres" by Christopher C. Cook (REV. PROG. COLORATION Vol. 12, 1982). Dye fixing agents suitable for use in the present invention are ammonium compounds such as fatty acid - diamine condensates e.g. the hydrochloride, acetate, metosulphate and benzyl hydrochloride of oleyldiethyl aminoethylamide, oleylmethyl-diethylenediaminemethosulphate, monostearyl-ethylene diaminotrimethylammonium methosulphate and oxidized products of tertiary amines; derivatives of polymeric alkyldiamines, polyamine-cyanuric chloride condensates and aminated glycerol dichlorohydrins.

[0035] A typical amount of the dye fixing agent to be employed in the composition of the invention is preferably up to 90% by weight, preferably up to 50% by weight, more preferably from 0.001% to 10% by weight, most preferably from 0.5% to 5% active by weight of the composition.

#### (E)-Stabilizers

[0036] Stabilizers can be present in the compositions of the present invention. The term "stabilizer," as used herein, includes antioxidants and reductive agents. These agents are present at a level of from 0% to about 2%, preferably from about 0.01% to about 0.2%, more preferably from about 0.035% to about 0.1% for antioxidants, and more preferably from about 0.01% to about 0.2% for reductive agents. These assure good odor stability under long term storage conditions for the compositions and compounds stored in molten form. The use of antioxidants and reductive agent stabilizers is especially critical for low scent products (low perfume).

[0037] Examples of antioxidants that can be added to the compositions of this invention include a mixture of ascorbic acid, ascorbic palmitate, propyl gallate, available from Eastman Chemical Products, Inc., under the trade names Tenox<sup>®</sup> PG and Tenox S-1; a mixture of BHT (butylated hydroxytoluene), BHA (butylated hydroxyanisole), propyl gallate, and citric acid, available from Eastman Chemical Products, Inc., under the trade name Tenox-6; butylated hydroxytoluene, available from UOP Process Division under the trade name Sustane<sup>®</sup> BHT; tertiary butylhydroquinone, Eastman Chemical Products, Inc., as Tenox TBHQ; natural tocopherols, Eastman Chemical Products, Inc., as Tenox GT-1/GT-2; and butylated hydroxyanisole, Eastman Chemical Products, Inc., as BHA; long chain esters (C<sub>8</sub>-C<sub>22</sub>) of gallic acid, e.g., dodecyl gallate; Irganox<sup>®</sup> 1010; Irganox<sup>®</sup> 1035; Irganox<sup>®</sup> B 1171; Irganox<sup>®</sup> 1425; Irganox<sup>®</sup> 3114; Irganox<sup>®</sup> 3125; and mixtures thereof; preferably Irganox<sup>®</sup> 3125, Irganox<sup>®</sup> 1425, Irganox<sup>®</sup> 3114, and mixtures thereof; more preferably Irganox<sup>®</sup> 3125 alone or mixed with citric acid and/or other chelators such as isopropyl citrate, Dequest<sup>®</sup> 2010, available from Monsanto with a chemical name of 1-hydroxyethylidene-1, 1-diphosphonic acid (etidronic acid), and Tiron<sup>®</sup>, available from Kodak with a chemical name of 4,5-dihydroxy-m-benzene-sulfonic acid/sodium salt, EDDS, and DTPA, available from Aldrich with a chemical name of diethylenetriaminepentaacetic acid. The chemical names and CAS numbers for some of the above stabilizers are listed in Table II below.

TABLE II

Antioxidant	CAS No.	Chemical Name used in Code of Federal Regulations
Irganox <sup>®</sup> 1010	6683-19-8	Tetrakis (methylene(3,5-di-tert-butyl-4 hydroxyhydrocinnamate)) methane
Irganox <sup>®</sup> 1035	41484-35-9	Thiodiethylene bis(3,5-di-tert-butyl-4-hydroxyhydrocinnamate
Irganox <sup>®</sup> 1098	23128-74-7	N,N'-Hexamethylene bis(3,5-di-tert-butyl-4-hydroxyhydrocinnamamide
Irganox <sup>®</sup> B 1171	23128-74-7	31570-04-4
		1:1 Blend of Irganox <sup>®</sup> 1098 and Irgafos <sup>®</sup> 168
Irganox <sup>®</sup> 1425	65140-91-2	Calcium bis(monoethyl(3,5-di-tert-butyl-4-hydroxybenzyl)phosphonate)
Irganox <sup>®</sup> 3114	65140-91-2	Calcium bis(monoethyl(3,5-di-tert-butyl-4-hydroxybenzyl)phosphonate)
Irganox <sup>®</sup> 3125	34137-09-2	3,5-Di-tert-butyl-4-hydroxy-hydrocinnamic acid triester with 1,3,5-tris(2-hydroxyethyl)-S-triazine-2,4,6-(1H, 3H, 5H)-trione
Irgafos <sup>®</sup> 168	31570-04-4	Tris(2,4-di-tert-butyl-phenyl)phosphite

[0038] Examples of reductive agents include sodium borohydride, hypophosphorous acid, Irgafos<sup>®</sup> 168, and mixtures thereof.

(F)-Soil Release Agent

[0039] Any polymeric soil release agent known to those skilled in the art can optionally be employed in the compositions of this invention. Polymeric soil release agents are characterized by having both hydrophilic segments, to hydrophilize the surface of hydrophobic fibers, such as polyester and nylon, and hydrophobic segments, to deposit upon hydrophobic fibers and remain adhered thereto through completion of washing and rinsing cycles and, thus, serve as an anchor for the hydrophilic segments. This can enable stains occurring subsequent to treatment with the soil release agent to be more easily cleaned in later washing procedures.

[0040] If utilized, soil release agents will generally comprise from about 0.01% to about 10.0%, by weight, of the detergent compositions herein, typically from about 0.1% to about 5%, preferably from about 0.2% to about 3.0%.

[0041] The following, all included herein by reference, describe soil release polymers suitable for use in the present invention. U.S. 3,959,230 Hays, issued May 25, 1976; U.S. 3,893,929 Basadur, issued July 8, 1975; U.S. 4,000,093, Nicol, *et al.*, issued December 28, 1976; U.S. Patent 4,702,857 Gosselink, issued October 27, 1987; U.S. 4,968,451, Scheibel *et al.*, issued November 6, 1987; U.S. 4,702,857, Gosselink, issued October 27, 1987; U.S. 4,711,730, Gosselink *et al.*, issued December 8, 1987; U.S. 4,721,580, Gosselink, issued January 26, 1988; U.S. 4,877,896, Maldonado *et al.*, issued October 31, 1989; U.S. 4,956,447, Gosselink *et al.*, issued September 11, 1990; U.S. 5,415,807 Gosselink *et al.*, issued May 16, 1995; European Patent Application 0 219 048, published April 22, 1987 by Kud, *et al.*.

[0042] Further suitable soil release agents are described in U.S. 4,201,824, Violland *et al.*; U.S. 4,240,918 Lagasse *et al.*; U.S. 4,525,524 Tung *et al.*; U.S. 4,579,681, Ruppert *et al.*; U.S. 4,240,918; U.S. 4,787,989; U.S. 4,525,524; EP 279,134 A, 1988, to Rhone-Poulenc Chemie; EP 457,205 A to BASF (1991); and DE 2,335,044 to Unilever N. V., 1974 all incorporated herein by reference.

[0043] Commercially available soil release agents include the METOLOSE SM 100, METOLOSE SM200 manufactured by Shin-etsu Kagaku Kogyo K.K., SOKALAN type of material, e.g., SOKALAN HP-22, available from BASF (Germany), ZELCON 5126 (from Dupont) and MILEASE T (from ICI).

(G)- Bactericides

[0044] Examples of bactericides used in the compositions of this invention include glutaraldehyde, formaldehyde, 2-bromo-2-nitro-propane-1,3-diol sold by Inolex Chemicals, located in Philadelphia, Pennsylvania, under the trade name Bronopol®, and a mixture of 5-chloro-2-methyl-4-isothiazoline-3-one and 2-methyl-4-isothiazoline-3-one sold by Rohm and Haas Company under the trade name Kathon 1 to 1,000 ppm by weight of the agent.

(H)- Perfume

[0045] The present invention can contain a perfume. Suitable perfumes are disclosed in U.S. Pat. 5,500,138, said patent being incorporated herein by reference. As used herein, perfume includes fragrant substance or mixture of substances including natural (i.e., obtained by extraction of flowers, herbs, leaves, roots, barks, wood, blossoms or plants), artificial (i.e., a mixture of different nature oils or oil constituents) and synthetic (i.e., synthetically produced) odoriferous substances. Such materials are often accompanied by auxiliary materials, such as fixatives, extenders, stabilizers and solvents. These auxiliaries are also included within the meaning of "perfume", as used herein. Typically, perfumes are complex mixtures of a plurality of organic compounds.

[0046] The range of the natural raw substances can embrace not only readily-volatile, but also moderately-volatile and slightly-volatile components and that of the synthetics can include representatives from practically all classes of fragrant substances, as will be evident from the following illustrative compilation: natural products, such as tree moss absolute, basil oil, citrus fruit oils (such as bergamot oil, mandarin oil, etc.), mastix absolute, myrtle oil, palmarosa oil, patchouli oil, petitgrain oil Paraguay, wormwood oil, alcohols, such as farnesol: geraniol, linalool, nerol, phenylethyl alcohol, rhodinol, cinnamic alcohol, aldehydes, such as citral, Helional™, alpha-hexyl-cinnamaldehyde, hydroxycitronellal, Lilial™ (p-tert-butyl-alpha-methyl-dihydrocinnamaldehyde), methyl-nonyl-acetaldehyde, ketones, such as allylionone, alpha-ionone, beta-ionone, isoraldein (isomethyl-alpha-ionone), methylionone, esters, such as allyl phenoxycetate, benzyl salicylate, cinnamyl propionate, citronellyl acetate, citronellyl ethoxylate, decyl acetate, dimethylbenzylcarbinyl acetate, dimethylbenzylcarbinyl butyrate, ethyl acetoacetate, ethyl acetylacetate, hexenyl isobutyrate, linalyl acetate, methyl dihydrojasmonate, styrallyl acetate, vetiveryl acetate, etc., lactones, such as gamma-undecalactone, various components often used in perfumery, such as musk ketone, indole, p-menthane-8-thiol-3-one, and methyl-eugenol. Likewise, any conventional fragrant acetal or ketal known in the art can be added to the present composition as an optional component of the conventionally formulated perfume (c). Such conventional fragrant acetals and ketals include the well-known methyl and ethyl acetals and ketals, as well as acetals or ketals based on benzaldehyde, those comprising phenylethyl moieties, or more recently developed specialties such as those described in a United States Patent entitled "Acetals and Ketals of Oxo-Tetralins and Oxo-Indanes, see U.S. Pat. No. 5,084,440, issued January 28, 1992,

assigned to Givaudan Corp. Of course, other recent synthetic specialties can be included in the perfume compositions for fully-formulated fabric softening compositions. These include the enol ethers of alkyl-substituted oxo-tetralins and oxo-indanes as described in U.S. Pat. 5,332,725, July 26, 1994, assigned to Givaudan; or Schiff Bases as described in U.S. Pat. 5,264,615, December 9, 1991, assigned to Givaudan.

**[0047]** The perfumes useful in the present invention compositions are substantially free of halogenated materials and nitromusks.

**[0048]** Perfume can be present at a level of from 0% to 10%, preferably from 0.1% to 5%, and more preferably from 0.2% to 3%, by weight of the finished composition. Fabric softener compositions of the present invention provide improved fabric perfume deposition.

#### (I)- Chelating Agents

**[0049]** The compositions and processes herein can optionally employ one or more copper and/or nickel chelating agents ("chelators"). Such water-soluble chelating agents can be selected from the group consisting of amino carboxylates, amino phosphonates, polyfunctionally-substituted aromatic chelating agents and mixtures thereof, all as herein-after defined. The whiteness and/or brightness of fabrics are substantially improved or restored by such chelating agents and the stability of the materials in the compositions are improved.

Amino carboxylates useful as chelating agents herein include ethylenediaminetetraacetates (EDTA), N-hydroxyethyl-ethylenediaminetriacetates, nitrilotriacetates (NTA), ethylenediamine tetrapropionates, ethylenediamine-N,N'-diglutamates, 2-hydroxypropylenediamine-N,N'-disuccinates, triethylenetetraaminehexacetates, diethylenetriaminepentaacetates (DETPA), and ethanoldiglycines, including their water-soluble salts such as the alkali metal, ammonium, and substituted ammonium salts thereof and mixtures thereof.

Amino phosphonates are also suitable for use as chelating agents in the compositions of the invention when at least low levels of total phosphorus are permitted in detergent compositions, and include ethylenediaminetetrakis (methylene phosphonates), and diethylenetriamine-N,N,N',N',N''-pentakis(methane phosphonate) (DETMP). Preferably, these amino phosphonates do not contain alkyl or alkenyl groups with more than 6 carbon atoms.

The chelating agents are typically used in the present rinse process at levels from 2 ppm to 25 ppm, for periods from 1 minute up to several hours' soaking.

**[0050]** The preferred EDDS chelator used herein (also known as ethylenediamine-N,N'-disuccinate) is the material described in U.S. Patent 4,704,233, cited hereinabove. The EDDS has advantages over other chelators in that it is effective for chelating both copper and nickel cations, is available in a biodegradable form, and does not contain phosphorus. The EDDS employed herein as a chelator is typically in its salt form, i.e., wherein one or more of the four acidic hydrogens are replaced by a water-soluble cation M, such as sodium, potassium, ammonium, triethanolammonium, and the like. At certain pH's the EDDS is preferably used in combination with zinc cations.

As can be seen from the foregoing, a wide variety of chelators can be used herein. Indeed, simple polycarboxylates such as citrate, oxydisuccinate, and the like, can also be used, although such chelators are not as effective as the amino carboxylates and phosphonates, on a weight basis. Accordingly, usage levels may be adjusted to take into account differing degrees of chelating effectiveness. The chelators herein will preferably have a stability constant (of the fully ionized chelator) for copper ions of at least 5, preferably at least 7. Typically, the chelators will comprise from 0.5% to 10%, more preferably from 0.75% to 5%, by weight of the compositions herein. Preferred chelators include DETMP, DETPA, NTA, EDDS and mixtures thereof.

#### (J)- Enzyme

**[0051]** The compositions and processes herein can optionally employ one or more enzymes such as lipases, proteases, cellulase, amylases and peroxidases. A preferred enzyme for use herein is a cellulase enzyme. Indeed, this type of enzyme will further provide a color care benefit to the treated fabric. Cellulases usable herein include both bacterial and fungal types, preferably having a pH optimum between 5 and 9.5. U.S. 4,435,307 discloses suitable fungal cellulases from *Humicola insolens* or *Humicola* strain DSM1800 or a cellulase 212-producing fungus belonging to the genus *Aeromonas*, and cellulase extracted from the hepatopancreas of a marine mollusk, *Dolabella Auricula Solander*. Suitable cellulases are also disclosed in GB-A-2.075.028; GB-A-2.095.275 and DE-OS-2.247.832. CAREZYME® and CELLUZYME® (Novo) are especially useful. Other suitable cellulases are also disclosed in WO 91/17243 to Novo, WO 96/34092, WO 96/34945 and EP-A-0,739,982. In practical terms for current commercial preparations, typical amounts are up to 5 mg by weight, more typically 0.01 mg to 3 mg, of active enzyme per gram of the detergent composition. Stated otherwise, the compositions herein will typically comprise from 0.001% to 5%, preferably 0.01%-1 % by weight of a commercial enzyme preparation. In the particular cases where activity of the enzyme preparation can be defined otherwise such as with cellulases, corresponding activity units are preferred (e.g. CEVU or cellulase Equivalent Viscosity Units). For instance, the compositions of the present invention can contain cellulase enzymes at a level equivalent

to an activity from 0.5 to 1000 CEVU/gram of composition. Cellulase enzyme preparations used for the purpose of formulating the compositions of this invention typically have an activity comprised between 1,000 and 10,000 CEVU/gram in liquid form, around 1,000 CEVU/gram in solid form.

#### 5 (K)- Other Optional Ingredients

[0052] The present invention composition can include optional components conventionally used in fully formulated laundry detergent compositions such as described in WO 97/05226, for example builders, bleaches, brighteners, colorants; surfactants; anti-shrinkage agents; fabric crisping agents; spotting agents; germicides; fungicides; anti-corrosion agents, antifoam agents, conventional fabric softeners, and the like.

[0053] The present invention can also include other compatible ingredients, including those as disclosed in WO96/02625, WO96/21714, and WO96/21715, and the polyamino functional polymers disclosed in co-pending application EP 97201488.0.

#### 15 Softening performance

[0054] The benefit provided by the use of the present invention is that the fabric softness which arises on fabrics, upon a laundering process, is improved, e.g. it is meant that laundered fabrics which are in contact with a polyhydroxyfatty acid amide compound or composition thereof exhibit an improved fabric softness versus fabrics which are in contact with no polyhydroxyfatty acid amide compound or no polyhydroxyfatty acid amide compound containing-composition but still laundered.

[0055] Accordingly, in another aspect of the invention, there is provided a method for softening the fabric, in particular upon domestic laundering processes, which comprises the steps of contacting the fabrics with a polyhydroxyfatty acid amide compound or a composition thereof as defined hereinbefore. Most preferably, the application of the polyhydroxyfatty acid amide compound to the fabric surface is made upon the rinsing step of a laundry process. More preferably, the polyhydroxyfatty acid amide compound is incorporated in fabric softening compositions.

[0056] In addition to the softness benefit, the use of the polyhydroxyfatty acid compound provides a better ease of ironing, especially under traditional ironing conditions which occurs at 200°C.

[0057] Accordingly, in a further aspect of the invention, there is provided a method for improving the ease of ironing of fabrics, which comprises the steps of contacting the fabrics with a polyhydroxyfatty acid amide compound or a composition thereof containing said compound as defined herein before and thereafter subjecting the treated fabrics to a heating source.

[0058] Preferably, the heating source is provided by a process selected from a tumble-drying process, ironing process and mixtures thereof. In particular, it has been found most beneficial for the ironing performance when the iron was set to a temperature of at least 100, preferably 200°C.

[0059] Further to the softness and ease of ironing benefit, the use of the polyhydroxyfatty acid compound has been found beneficial to reduce or inhibit the fabric abrasion. Accordingly, it is an object of the present invention to provide a method for reducing fabric abrasion, which comprises the steps of contacting the fabrics with a polyhydroxyfatty acid amide compound or a composition thereof containing said compound as defined herein before.

[0060] The benefits of the invention are visually assessed. The methods of assessment are comparative and thus only one treated fabric respective to another untreated may be tested at any one time.

[0061] In the exemplified compositions, the abbreviated component identifications have the following meanings:

Fatty acid	tallow fatty acid IV=18
Electrolyte	Calcium chloride
TAE25	Tallow alcohol ethoxylated with 25 moles of ethylene oxide per mole of alcohol
PEG	Polyethylene Glycol 4000
C25AS	Sodium C <sub>12</sub> -C <sub>15</sub> linear alkyl sulphate
C <sub>x</sub> yEzS	Sodium C <sub>1x</sub> -C <sub>1y</sub> branched alkyl sulphate condensed with z moles of ethylene oxide
Cationic ester	Mixture of C <sub>12</sub> /C <sub>14</sub> choline ester



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(continued)

TFAA	C <sub>16</sub> -C <sub>18</sub> alkyl N-methyl glucamide
TPKFA	C12-C14 topped whole cut fatty acids
Citric acid	Anhydrous citric acid
Savinase	Proteolytic enzyme of activity 4KNPU/g
Termamyl	Amylolytic enzyme of activity 60KNU/g
all sold by NOVO Industries A/S and of activity mentioned above unless otherwise specified	
DTPMP	Diethylene triamine penta (methylene phosphonate), marketed by Monsanto under the Trade name Dequest 2060

## Example 1

[0062] Using the test method defined above, fabrics were contacted with various polyhydroxyfatty acid compounds added during the last rinse and thereafter fabric softness was measured.

[0063] The polyhydroxyfatty acid compounds that were tested are a C16 polyhydroxyfatty acid compound and a C12 polyhydroxyfatty acid compound.

[0064] It was observed that fabrics treated with the polyhydroxyfatty acid compounds exhibited an improved softness, ease of ironing, as well as reduced fabric abrasion versus compositions that were not treated.

## Example 2

[0065] Similar results were obtained when the following compositions were used.

Component	A	B	C	D
C12 polyhydroxyfatty acid	10	-	5	2
C16 polyhydroxyfatty acid	-	10	-	2
TAE25		1.0	-	-
Fatty acid	0.3	1.0	-	-
Hydrochloride acid	0.02	0.02	0.02	-
PEG	-	0.6	0.6	-
Perfume	1.0	1.0	1.0	0.1
Silicone antifoam	0.01	0.01	0.01	-
Electrolyte (ppm)	-	600	600	-
Dye (ppm)	10	50	50	-
Water and minors to balance to 100				

## Example 3

[0066] Similar results are obtained when fabrics treated with a laundry composition and thereafter subjected to ironing. The laundry composition is as follows:

	E
C25AS	13

(continued)

	E
C25E3S	2
TFAA	6
C12-14 alkyl dimethylhydroxy ethyl ammonium chloride	1
Cationic ester	1.5
TPKFA	15
Citric acid	1
Ethanol	2
1,2 Propanediol	8
NaOH up to pH	7.5
DTPMP	1.2
Savinase	0.5
Termamyl (300 KNU/g)	0.15
Boric acid	1.5
Softening clay of the bentonite type	4
Suspending clay SD3	0.3
Balance (Moisture and Miscellaneous)	100

[0067] It was observed that fabrics treated with the polyhydroxyfatty acid compounds exhibited an improved softness, ease of ironing, as well as reduced fabric abrasion versus compositions that were not treated with the polyhydroxyfatty acid compounds.

### Claims

1. Use of a polyhydroxyfatty acid amide compound as a softening compound.
2. Use of a polyhydroxyfatty acid amide compound as an ironing aid.
3. Use of a polyhydroxyfatty acid amide compound for reducing fabric abrasion.
4. Use according to any one of Claims 1-3, wherein said compound has the formula:



wherein :  $R^1$  is H,  $C_1$ - $C_4$  hydrocarbyl, 2-hydroxy ethyl, 2-hydroxypropyl, or a mixture thereof, and  $R^2$  is a  $C_5$ - $C_{31}$  hydrocarbyl; and Z is a polyhydroxyhydrocarbyl having a linear hydrocarbyl chain with at least 3 hydroxyls directly connected to the chain, or an alkoxylated derivative thereof.

5. Use according to Claim 4, wherein  $R^1$  is  $C_1$ - $C_4$  alkyl, more preferably  $C_1$  or  $C_2$  alkyl, most preferably  $C_1$  alkyl (i.e., methyl),  $R^2$  is preferably a straight chain  $C_7$ - $C_{19}$  alkyl or alkenyl, more preferably straight chain  $C_9$ - $C_{17}$  alkyl or alkenyl, most preferably straight chain  $C_{11}$ - $C_{17}$  alkyl or alkenyl, or mixtures thereof, and Z is preferably derived from a reducing sugar in a reductive amination reaction; more preferably is a glycidyl.
6. Use according to anyone of Claims 1-5, wherein said polyhydroxyfatty acid amide compound is incorporated into compositions at a level of from 0.005% to 50%, more preferably from 0.05% to 20%, most preferably from 0.1% to 5% by weight of the composition.
7. Use according to Claim 6, wherein said composition is selected from pre-or post wash additives, rinse added compositions, rinse added fabric softener compositions, and dryer added compositions, preferably rinse added fabric

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softener compositions and rinse added compositions,.

8. Use according to either one of Claims 6 or 7, wherein said composition is a liquid composition.

5 9. A method for softening fabrics, which comprises the steps of contacting the fabrics with a polyhydroxyfatty acid amide compound as defined in any one of Claims 1-5 or a composition thereof as defined in any one of Claims 6-8.

10 10. A method for reducing fabric abrasion, which comprises the steps of contacting the fabrics with a polyhydroxyfatty acid amide compound as defined in any one of Claims 1-5 or a composition thereof as defined in any one of Claims 6-8.

15 11. A method for improving the ease of ironing of fabrics, which comprises the steps of contacting the fabrics with a polyhydroxyfatty acid amide compound as defined in any one of Claims 1-5 or a composition thereof as defined in any one of Claims 6-8 and thereafter subjecting the treated fabrics to a heating source.

12. A method according to Claim 11, wherein said heating source is provided by a process selected from a tumble-drying process, ironing process and mixtures thereof.



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## EUROPEAN SEARCH REPORT

Application Number  
EP 97 30 9475

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
X	US 3 654 166 A (ECKERT HANS-WERNER ET AL.) * claims 1,9 *	1,6,7,9	C11D1/52
X	US 3 637 495 A (ECKERT HANS-WERNER ET AL.) * claims 1-3 *	1,3,6-10	
X	GB 1 244 505 A (HENKEL & CIE. GMBH) * claims 1,26 *	1,8,9	
E	WO 97 47716 A (HENKEL KGAA.) * page 4 - page 7; claims 1-5,8 *	1,4-9	
A	EP 0 522 206 A (THE PROCTER & GAMBLE CO.) * page 3 - page 5; claims *	1,4-7,9	
A	US 5 500 137 A (BACON DENNIS R. ET AL.) * column 3, line 28 - column 11, line 33 * * column 18, line 19 - column 19, line 55; claim 1 *	1,4-7,9	
D,A	WO 92 22698 A (HENKEL KGAA.) * the whole document *	1	TECHNICAL FIELDS SEARCHED (Int.Cl.6)
D,A	EP 0 380 406 A (COLGATE-PALMOLIVE CO.) * the whole document *	1	C11D
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 20 April 1998	Examiner Serbetsoglou, A
<p>CATEGORY OF CITED DOCUMENTS</p> <p>X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document</p> <p>T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons &amp; : member of the same patent family, corresponding document</p>			

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